Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Reserve
281.9
R313A

Changes in FARM PRODUCTION AND EFFICIENCY

LIBRARY
RECEIVED
AUG 21 1956
U. S. DEPARTMENT OF AGRICULTURE

1955 SUMMARY

ARS 43-33

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Research Service
WASHINGTON, D. C JUNE 1956

PREFACE

This is the third issue of an annual publication that was designed specifically to present the major statistical series on farm production, production inputs, and efficiency. The publication was inaugurated as a means of providing in one place the latest information for each of the several series that have been developed to appraise such things as production in peace and war, changes in farm inputs and practices, improvement in labor productivity, and progress of farm mechanization.

The many people who are interested in keeping abreast of, or making studies of, changes in the output and productive efficiency of agriculture in the United States will find the information contained herein of use. The data will help the user to get a historical perspective of what has happened and to measure current changes.

Although the publication consists basically of statistical series, a brief digest of what each series shows to date is included as is explanation of the methods used in developing each statistical measure.

For several of the series, data are presented for geographic divisions as well as for the United States as a whole. Data for geographic divisions are available for some of the other series shown here on a national basis. These data are issued as supplements which are available upon request.

Supplement I contains nine regional tables of index numbers of farm production for each of the groups of livestock and crops shown in table 1.

Supplement II contains nine regional tables of index numbers of man-hours of farm labor used for each of the groups of livestock and crops shown in table 12.

Supplement III contains nine regional tables of index numbers of farm production per man-hour for each of the groups of livestock and crops shown in table 14.

Requests for these supplements should be sent to the Information Division, Agricultural Research Service, United States Department of Agriculture, Washington 25, D. C.

Several persons in the Farm Income Branch and the Agricultural Estimates Division, Agricultural Marketing Service, assisted by supplying the data on which many of the series are based.

Prepared in
Production Economics Research Branch
Agricultural Research Service
United States Department of Agriculture

CONTENTS

	Page
Highlights of changes	1
Farm production	6
Acreages of harvested crops used for specified purposes	11
Cropland used for crops and crop production per acre	15
Use of fertilizer and lime in the United States	20
Animal units of breeding livestock and livestock production per breeding unit	24
Man-hours of farmwork	26
Farm labor productivity	31
Number of farm machines	35
Persons supported by production of one farmworker	41

LIST OF TABLES

Table	Page
1.- Farm production: Index numbers of total output, and gross production of livestock and crops, by groups, United States, 1910-55	8-9
2.- Index numbers of farm output, by geographic divisions, 1919-55	10
3.- Acreages of harvested crops used for specified purposes, United States, 1910-55	14
4.- Index numbers of cropland used for crops, and crop production per acre, United States, 1910-55	17
5.- Index numbers of cropland used for crops, by geographic divisions, 1919-55	18
6.- Index numbers of crop production per acre, by geographic divisions, 1919-55	19
7.- Use of principal plant nutrients and agricultural lime, United States, 1910-55	21
8.- Use of fertilizer in terms of principal plant nutrients, United States, by regions, 1930-55	22
9.- Index numbers of use of fertilizer in terms of principal plant nutrients, United States, by regions, 1930-55	23

Table Page

10.- Index numbers of animal units of breeding livestock and livestock production per breeding unit, United States, 1919-55..... 25

11.- Man-hours of labor used for farmwork, United States, 1910-55..... 27

12.- Index numbers of man-hours of labor used for farmwork, by groups of enterprises, United States, 1910-55.....28-29

13.- Index numbers of man-hours of labor used for farmwork, by geographic divisions, 1919-55..... 30

14.- Index numbers of farm production per man-hour, by groups of enterprises, United States, 1910-55.....32-33

15.- Index numbers of farm output per man-hour, by geographic divisions, 1919-55..... 34

16.- Motor vehicles and specified machines on farms, United States, January 1, 1910-56.....38-39

17.- Number of tractors on farms, by type, United States, January 1, 1945-56..... 40

18.- Persons supported by production of one farmworker, United States, 1820-1955..... 43

CHANGES IN FARM PRODUCTION AND EFFICIENCY

Prepared in Production Economics Research Branch

HIGHLIGHTS OF CHANGES

Farm output and production, by groups of commodities.- Total farm output in the United States for 1955 was at a record high. It was 112 percent of the 1947-49 average (table 1). The previous high was 108 in 1953 and 1954. This achievement in 1955 resulted from the combination of a record livestock production and the second largest crop production of record.

Total production of livestock in 1955 was more than 3 percent larger than in 1954. Farm production of meat animals last year was 5 percent greater than in 1954. Production of dairy products reached a new high because of a record production per cow from a slightly smaller number of milk cows. Production of poultry and eggs was down somewhat from the year before.

Total crop production in 1955 was only 1 percent smaller than the record 1948 production. The 1955 production of each of the individual crop groups was more than in 1954, except for food grains and sugar crops. Oil crops were the only group of crops to set a new alltime high. The feed grains and the hay and forage groups had the second largest production on record, making available more than an adequate supply of feed for the large number of livestock on farms. Feed used by horses and mules continued the downward trend started in 1918.

Total harvested acres in 1955 were about the same as in 1954. Reductions from 1954 acreage were made in wheat, cotton, rice, tobacco, corn, and sugarbeets, all of which were under allotment programs. Increases in acreage, which in total largely offset these decreases, were made in hay, all sorghums, soybeans, barley, rye, and peanuts.

An unusually large number of crops attained record yields in 1955. Although weather favored crop development in many of the important producing areas in 1955, further use of improved production practices was important. Total tonnage of fertilizer nutrients used by farmers, for example, continued to increase despite lower income.

Farm output by geographic divisions.- Farm output for 1955 was greater than in 1954 in 6 of the 9 geographic divisions (table 2). Record farm production was attained in the East North Central, South Atlantic, and East

South Central divisions in 1955. All other regions had near-record production. More than 45 percent of the United States farm output was produced in the 2 North Central divisions last year.

Acreages of harvested crops used for specified purposes.- Of the 340 million acres of harvested crops in 1955, about 10.5 percent were used to produce products for export; 3 percent produced feed for horses and mules; and 86.5 percent produced food, fiber, and tobacco for domestic human use. Acreages used for producing commodities exported in 1955 increased from the previous year but were still below the 1946-54 average by about 15 percent. Only 10 million acres were needed in 1955 to produce grain and hay for feed for horses and mules, compared with 92 million acres so used in the World War I period. The 82 million acres thus diverted to production for human use represent more than a fourth of the acreage of harvested crops needed to feed our 1955 population of 165 million. We can no longer look to the disappearance of horses and mules as a source of many additional acres for production of agricultural products for human use (table 3).

Crop production per acre.- Crop production per acre in 1955 for the United States as a whole was the second largest on record. It was 4 percent more than in 1954 and 5 percent greater than the 1947-49 average. Five regions attained a record production per acre. Percentagewise, the East South Central region had the largest increase per acre from 1954 to 1955 (tables 4 and 6).

Cropland used for crops.- Cropland used for crops in 1955 remained at about the same level that has persisted throughout the postwar period. Continuation of government acreage-allotment programs in 1955 did not change the total United States use of cropland for crops from 1954. However, in the New England, Middle Atlantic, South Atlantic, and East South Central regions, the number of acres used for crops decreased to the lowest level since 1919. Offsetting the decreases in these regions was the record number of acres used for crops in the West North Central and Mountain regions (tables 4 and 5).

Use of fertilizer and lime.- Use of plant nutrients in commercial fertilizers has increased steadily. In 1955, about 6 million tons of fertilizer were used, 65 percent more than the 1947-49 average (table 7). Greatest increases were in the North Central and Mountain States, although the latter accounted for only 2 percent of the total used in the United States in 1955. Most striking increases were in the East North Central States where nearly a fourth of all fertilizer used in the United States was applied in 1955. Only about 13 percent of the total was accounted for by these States in 1940. The West North Central States used less than 2 percent of all fertilizer in 1940 and 13 percent in 1955. Large percentage increases occurred in all regions but the older areas of use such as New England, the Middle and South

Atlantic, and the East South Central regions used less relative to total consumption in the United States in 1955 than they used in 1940 (tables 8 and 9).

The highest use of lime occurred generally from 1946 through 1952. Substantial reductions from levels attained in the base period 1947-49 occurred in 1953 and 1954 (table 7).

Production per breeding unit of livestock.- The number of animal units of breeding livestock in 1955 was the largest since World War II. There were 2 percent more than in 1954 and 6 percent more than in 1947-49. Production per breeding unit continued its upward trend and attained a new record high. During the last 15 years, production per breeding unit has increased by more than a fifth. During this period, milk production per cow rose by 1,200 pounds, eggs per layer were stepped up by 60, and pigs saved per litter reached an alltime high (table 10).

Man-hours of farm work.- Slightly fewer man-hours of labor were used for farmwork in 1955 than in 1954. In both years, the total was above 14.6 billion man-hours (table 11). This represents a reduction of almost two-fifths from the pre-World War I average. Although the annual variation in man-hours of labor used for farmwork was considerable, around 23 billion hours were used on the average per year until about 1930. The poor crops in the drought years of 1934 and 1936 resulted in low labor needs for these years. Mechanization and other factors have been dominant in reducing man-hours of farmwork by more than a fourth since before World War II and by about 15 percent since 1947-49.

The amount of farm labor used by the different crops and livestock has followed various trends through the years (table 12). The labor used in caring for horses and mules has been reduced sharply, chiefly as a result of the decline in numbers of these animals. The longtime increase in time devoted to other kinds of livestock reflects the rise in numbers and production of livestock. In addition, mechanization of livestock chores has been less pronounced than mechanization of crop production. Only about half as much labor time is now used on crops as was used before World War I.

In use of labor on farms, the Pacific region is unique among the geographic divisions. It is the only region in which more labor is now used on farms than was used in 1919-21 (table 13). The increase in the Pacific region of labor-intensive crops has been chiefly responsible. Use

of labor on farms since the years immediately following World War I has declined 40 percent or more in the New England, Middle Atlantic, East North Central, West North Central, and West South Central States.

Farm labor productivity.- Even though the input of farm labor in the United States has been reduced significantly, total farm production has continued to increase substantially. More production with less work means that farm output per man-hour is now almost twice as great as the pre-World War II average and more than a fourth higher than in 1947-49 (table 14). The increase in labor productivity in producing food grains has been greater than for any other group of enterprises. About 5 times as much food grains are now produced with each hour of work as before World War I. The improvement in labor productivity for the livestock enterprises has lagged in most instances.

The upward climb in labor productivity has occurred in all parts of the country (table 15). Since 1919-21, the smallest regional increase in farm output per man-hour has been more than 100 percent. Farm output per man-hour has about tripled in the West South Central and East North Central divisions, the areas with the greatest increase.

Farm machines.- Although the number of farms decreased from April 1950 to November 1954 by about 600,000, numbers of 8 principal machines on farms increased each year during this period (tables 16 and 17). From April 1, 1950, through January 1, 1956, substantial increases continued in numbers of field tractors, motortrucks, grain combines, and compickers; in the order listed, the percentage increases were 31, 27, 40, and 54. For several years, farms have been well equipped with automobiles and milking machines. The increase in automobile numbers from 1950 to 1956 was only 1.5 percent and the increase in number of farms having milking machines was only 13 percent. Increases in the two newer machines on farms--forage harvesters and pickup balers--amounted to 178 and 150 percent, respectively, in the 6 years. The number of garden tractors on farms increased substantially also during the 6 years, or by 67 percent.

Persons supported by production of one farmworker.- During 1955, each farmworker in the United States produced enough food, fiber, and tobacco to supply himself and almost 19 other persons (table 18). This was almost 5 times the number of persons supplied with agricultural products by each farmworker in 1820. Over half of this increase in the number of persons supported per worker, or 57 percent, came in the last 15 years of the 135-year period, when the number of persons supported per worker rose from 10.81 in 1940 to 19.74 in 1955. Improved technology, both on and off the farm, has enabled farmers to produce increasing quantities of farm products with

a decreasing number of workers. As a result, our increasing population has continued to be well fed and clothed, while at the same time rural workers were released for industrial employment. In 1955, farmworkers made up less than 5 percent of the total population, compared with 25 percent of the total in 1820 and 8 1/3 percent of the total in 1940.

FARM PRODUCTION

Farm output measures the annual volume of farm production available for eventual human use through sales from farms or consumption in farm households.

Three major subgroups are combined in computing farm output:

Production of crops.- Includes the total constant-dollar value of all crop production regardless of its final disposition. No deductions are made for seed used or quantities fed to livestock. In calculating farm output, the value of production of hay seeds, pasture seeds, and cover-crop seeds, and of feed used by farm horses and mules, is excluded.

Production of livestock and products.- Includes the total constant-dollar value of production of all livestock and livestock products except horses and mules. Livestock production is made up of three components: Constant-dollar value of pasture consumed, other feed consumed, and the product added in converting feed and pasture into livestock and livestock products for human use. The livestock indexes are based on the total constant-dollar value of production of livestock and livestock products. In combining production of livestock and crops into total farm output, the value of feed consumed other than pasture is excluded from livestock production to avoid double counting of the production of feed crops included in crop production.

Feed used by farm horses and mules.- Includes the estimated constant-dollar value of feed other than pasture consumed by this class of livestock. The constant-dollar value of this feed is subtracted from the sum of the values of production of crops and of livestock and livestock products in calculating farm output.

Average values per unit of each commodity were used as weights in constructing the indexes. Separate sets of average values were calculated for use as weights in each of the nine census geographic divisions. The quantity data for crops are total production in the crop year. The quantity data for livestock are net live-weight production or the quantity of livestock products for the calendar year. Official reports of the Crop Reporting Board of the Agricultural Marketing Service are the chief sources of data on both production and prices. The most important item of production omitted was production from farm forests. This, plus other minor items omitted probably accounts for less than 5 percent of the total output in recent years. Commodities of little importance were omitted in some regions for the earlier part of the period covered.

Two weight periods were used. Average values per unit for 1935-39 were used as weights for 1939 and prior years. Weighted average values per unit for 1947-49 were used for the period beginning in 1940. The index series for the two subperiods are "spliced" together in 1940 through the use of overlapped calculations for that year.

Annual quantity-price aggregates for the United States were obtained by summing the regional data for 1919 to date. The series was extended back to 1910 on a United States basis only.

The Crop Reporting Board of the Agricultural Marketing Service calculates the preliminary indexes of crop production for the current year based on its monthly forecasts of crop production beginning in July of each year. These preliminary indexes for the current year are prepared only for the United States total, but they are directly comparable with the historical indexes for the United States built up on a regional basis by the Agricultural Research Service.

The output index differs in concept, but not generally in commodity coverage, from the index of marketings and home consumption prepared by the Agricultural Marketing Service. Both indexes reflect long-run changes in farm production for human use. The output index covers production in the year it is produced; changes in farm inventories of livestock are taken into account. The index of marketings and home consumption reflects production only as it enters the marketing system in the form of sales by farmers or as direct consumption in farmers' households, regardless of the year in which it is produced. The marketings-and home-consumption index tends to be higher than the index of farm output in years when farmers sell or consume more than they produce; conversely, it tends to be lower in years when farmers are building up their inventories.

Table 1.- Farm production: Index numbers of total output, and gross production of livestock and crops, by groups, United States, 1910-55 (1947-49 = 100)

Year	Farm output	Livestock and livestock products 1/: All livestock and livestock products 2/	Meat animals 3/	Dairy products 4/	Poultry and eggs 5/	Crops: All crops 6/	Feed grains 7/	Hay and forage 8/	Food grains 9/	Vegetables 10/	Fruits and nuts 11/	Sugar crops 12/	Cotton 13/	Tobacco	Oil crops 14/	Feed used by farm horses and mules 15/
1910	61	60	66	58	47	69	90	74	52	58	53	80	82	55	9	288
1911	59	61	66	59	49	67	77	63	51	55	65	88	111	45	12	296
1912	66	61	68	59	47	77	96	83	60	63	69	79	96	54	17	301
1913	60	63	71	61	47	68	75	75	61	59	53	86	100	48	11	306
1914	66	64	74	61	47	75	81	80	72	62	77	78	113	50	10	312
1915	68	67	77	63	49	78	95	89	81	62	72	80	79	56	10	315
1916	62	66	77	63	47	70	80	96	54	58	65	87	80	58	12	316
1917	65	67	77	64	47	75	96	85	53	69	56	102	79	64	14	317
1918	66	68	80	64	48	75	85	83	76	67	61	103	84	70	15	318
1919	66	66	73	66	50	76	86	93	80	63	63	89	80	70	12	315
1920	70	64	68	65	49	83	100	92	70	70	73	107	94	73	15	305
1921	62	66	71	68	51	71	91	85	67	65	48	102	56	49	13	297
1922	68	71	79	70	55	76	86	96	72	75	79	79	68	60	13	289
1923	69	74	81	72	58	76	91	90	62	72	79	80	71	74	16	281
1924	68	73	78	74	57	76	77	92	69	74	73	77	95	61	25	272
1925	70	71	73	76	58	78	91	79	55	72	68	77	113	67	21	263
1926	73	74	75	77	62	80	83	79	67	74	89	73	126	63	19	255
1927	72	76	78	79	64	79	85	98	71	78	68	74	91	61	25	245
1928	75	76	78	80	62	82	90	85	73	81	81	72	101	68	22	236
1929	74	77	77	82	63	79	83	88	66	81	76	76	104	75	21	227
1930	72	78	78	84	65	76	73	75	72	82	75	88	98	81	23	219
1931	79	80	82	86	63	84	84	79	76	83	94	83	119	76	23	212
1932	76	81	83	86	63	80	95	86	62	83	76	96	91	49	21	204
1933	70	82	86	87	62	71	73	79	45	80	77	108	91	68	18	198
1934	60	75	73	85	59	58	48	67	44	87	72	89	68	54	21	194

1935	72	72	66	86	59	76	80	96	53	88	91	95	75	65	34	191
1936	65	77	74	87	63	64	53	74	52	83	72	100	87	58	27	186
1937	82	76	71	86	63	88	87	87	72	89	95	101	133	78	30	182
1938	79	79	77	89	65	83	84	98	75	89	85	120	84	69	36	176
1939	80	85	87	90	69	82	83	93	61	88	98	111	83	94	47	171
1940	83	87	89	92	70	85	85	106	67	91	95	108	88	72	56	167
1941	86	92	94	96	77	86	91	106	76	92	102	102	75	62	61	162
1942	96	102	107	100	89	97	104	115	80	96	100	117	90	70	92	155
1943	94	111	120	99	102	90	96	110	69	103	87	86	80	70	98	148
1944	97	105	108	101	102	96	100	109	85	99	102	85	86	96	82	140
1945	96	104	103	103	106	93	97	113	89	101	93	96	63	98	88	131
1946	98	101	101	102	99	98	105	104	92	110	110	105	61	114	85	122
1947	95	100	100	101	98	93	81	103	108	98	104	112	83	105	91	110
1948	104	97	97	98	96	106	116	100	103	103	96	93	104	98	109	100
1949	101	103	103	101	106	101	103	97	89	99	100	95	113	97	100	90
1950	100	106	107	101	111	97	104	105	83	101	102	117	70	101	116	82
1951	103	111	114	100	119	99	97	110	81	95	105	93	106	115	106	74
1952	107	112	115	101	123	103	102	105	105	96	102	95	106	112	104	64
1953	108	114	114	106	127	103	101	108	96	100	104	106	115	102	102	57
1954 16/	108	117	121	107	125	101	105	107	85	98	105	118	96	111	116	51
1955 16/	112	121	127	108	123	105	111	114	80	100	107	110	103	112	129	43

1/ Production of livestock and livestock products for human use, horses and mules excluded.

2/ Includes clipped wool, mohair, and for 1940 to date, honey and beeswax. These items are not included in the separate groups of livestock and products shown.

3/ Cattle and calves, sheep and lambs, and hogs.

4/ Butter, butterfat, wholesale milk, retail milk, and milk consumed on farms.

5/ Chicken eggs, commercial broilers, chickens, and turkeys.

6/ Includes production of hay seeds, pasture seeds and cover-crop seeds, and some miscellaneous crop production not included in separate groups of crops shown. Coverage of production of seed and miscellaneous crops is more complete for 1940 to date than for prior years.

7/ All corn, oats, barley, and sorghum grain.

8/ All hay, sorghum forage, and for 1940 to date, sorghum silage.

9/ All wheat, rye, buckwheat, and rice.

10/ Potatoes, sweetpotatoes, dry edible beans, dry field peas, truck crops for processing, truck crops for fresh market, and farm gardens.

11/ Fruits, berries, and tree nuts.

12/ Sugar beets, sugarcane for sugar and seed, sugarcane sirup, sorghum sirup, maple sugar, and maple sirup.

13/ Cotton lint and cottonseed.

14/ Soybeans, peanuts picked and threshed, peanuts hogged, flaxseed, and for 1940 to date, tungnuts.

15/ Hay and concentrates only.

16/ Basic data for livestock, 1954-55, were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

Note: Supplement I to this publication contains a similar table for each geographic division. See Preface.

Table 2.- Index numbers of farm output, by geographic divisions, 1919-55
(1947-49=100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
1919	75	81	68	64	69	71	71	44	47	66
1920	69	87	69	72	75	71	79	56	46	70
1921	71	74	62	67	57	64	62	58	46	62
1922	68	86	68	75	62	72	62	57	49	68
1923	73	80	71	75	66	64	63	63	54	69
1924	74	84	67	75	64	68	74	59	45	68
1925	72	82	72	75	67	78	69	63	51	70
1926	71	82	71	68	73	84	88	64	56	73
1927	70	80	65	80	71	70	74	74	59	72
1928	70	80	70	83	70	70	82	75	61	75
1929	75	77	67	79	74	81	77	70	62	74
1930	76	79	64	79	73	68	69	74	65	72
1931	78	86	78	74	79	91	96	64	62	79
1932	75	81	76	83	62	75	86	67	65	76
1933	77	81	66	68	73	78	76	64	62	70
1934	77	82	62	43	70	76	57	56	63	60
1935	77	87	76	65	79	76	69	64	70	72
1936	78	81	66	47	73	78	66	62	71	65
1937	83	90	83	69	87	103	94	68	76	82
1938	79	88	81	72	79	89	81	76	76	79
1939	83	88	85	73	88	81	80	71	76	80
1940	84	90	83	79	88	80	87	77	80	83
1941	84	89	89	86	78	87	83	87	83	86
1942	92	97	97	104	91	97	94	92	86	96
1943	100	92	94	101	90	96	87	96	89	94
1944	94	98	94	101	99	99	97	95	93	97
1945	96	97	98	100	98	96	82	93	93	96
1946	101	103	100	102	102	92	83	94	101	98
1947	99	98	90	93	100	94	94	99	98	95
1948	101	101	105	109	102	110	95	102	100	104
1949	100	101	105	98	98	96	111	99	102	101
1950	101	106	102	104	101	91	88	101	104	100
1951	98	107	106	100	115	96	91	104	110	103
1952	99	106	110	111	109	95	93	111	115	107
1953	105	109	112	105	112	104	98	118	116	108
1954 1/	100	110	113	109	108	96	99	111	120	108
1955 1/	104	108	118	109	118	111	103	115	119	112

1/ Basic data for livestock, 1954-55 were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

ACREAGES OF HARVESTED CROPS USED FOR SPECIFIED PURPOSES

This series measures changes in the total acreage of crops harvested, in acreages used for different broad purposes, and in acreages used per capita to produce food, fiber, and tobacco for domestic human use. The acreage for per capita production is derived by subtracting from total harvested crop acres the sum of the acreages used for producing export products and feed for all horses and mules in the United States, and dividing the remainder by the total population of the United States on July 1.

It should be noted that these acreages are for harvested crops only. They do not include acreages of pasture. Total harvested crop acres consist of the area in the 59 crops harvested (excluding duplication) plus acreages in tree fruits, small fruits, tree nuts, and farm gardens. Acreages of several minor crops are not included; in recent years, these minor crops have accounted for about 0.5 million acres. Basic data for the estimates are published in the releases of the Crop Reporting Board of the Agricultural Marketing Service and in Census of Agriculture reports from the Bureau of the Census.

Acreages used for producing exports are determined for each crop exported by dividing the quantity exported by the United States average yield per acre for the given year. There are two steps in computing the acreages of crops used to produce each of the livestock products. The first consists of estimating the quantities of each feed crop used to produce 100 pounds of pork, 100 pounds of milk, 100 dozen eggs, and so on. The second consists of determining the quantity of each feed crop used to produce the products exported, and then determining the acreages needed to produce each feed crop, at United States average yields per acre. Periodic 5-year average yields rather than yields for each year are used.

The method used to convert exports of pork and lard to acreages of grain crops will illustrate the procedure. Pounds of pork exports for a given year were divided by 0.703 to convert the exports to a live weight of hog basis. Exports of lard were divided by 0.562 to determine the live weight of hogs required to produce the lard.

On the average, it was assumed that approximately 400 pounds of grain (corn equivalent) were required to produce 100 pounds of live weight of hogs, in the usual proportion of pork and lard exported. At average 1935-39 corn yields, 1 acre of corn would produce about 340 pounds of hog, or corn from 0.292 of an acre would be required to produce 100 pounds of live hog. 0.292 times the total hundredweight of live hogs from which the exports came gives the total acreage of corn used to produce the pork and lard exported. Similar procedures were used to convert other animal products exported into the crop acreages required to produce them.

From 1910 to 1939, farm acreages used to produce crop exports are based on the average United States yield of each crop exported for the specified year, and the quantity exported during the year, beginning with July or with the month that represents the start of the crop season. Beginning with 1940, acreages for crop exports and lend lease are for calendar years, and, as above, they are based on average United States yields for specified years.

Acreages for producing livestock exports for 1910 to 1939 are based on United States average crop yields for 1935-39, and the volume of livestock products exported during the specified year beginning July 1. Beginning with 1940, livestock for export and lend lease are for calendar years. From 1940 to 1944, acreages used for exports are based on yearly exports and United States average yields for 1940-44; for 1945-49, yearly exports and 1945-49 average yields were used; for 1950-55, yearly exports and 1950-54 average yields were used.

Yield data for making the export estimates are taken from the various reports of the Crop Reporting Board. Data for volume of exports prior to 1940 are from various issues of Agricultural Statistics, issued by the United States Department of Agriculture. From 1940, they are summarized from reports and records of the consumption section of the Statistical and Historical Research Branch, Agricultural Marketing Service.

Estimates of feed consumed by horses and mules are based on average rations of corn, oats, and all hay, as follows. From 1910 through 1919 the calculations allow 800 pounds of oats, 1,600 pounds of shelled corn, and 1.8 tons of hay per head for farm horses and mules 3 years or more of age and animal-unit equivalents for younger animals. From 1920 through 1940, it was assumed that as farm horses were worked less, they consumed less grain and more hay per head. Consequently, the rate of feeding corn was decreased 10 pounds per head per year and the rate of feeding hay was increased 20 pounds.

Beginning with 1941, and for some years thereafter, it was assumed that horses and mules would work less each year, and that on the average they would be fed less corn, oats; and hay and would consume more pasture. Estimated reductions in the grain ration were made by 5-year periods extended to 1965, as it was assumed that no further reduction in the grain ration would occur after that year. The reduction varied slightly from year to year and over the entire period, 1940-65, it averaged as follows: Corn, 16 pounds per head per year; oats, about 19 pounds per head per year. The same procedure of estimating was followed for hay, except that no further reduction in the average hay ration was allowed after 1955. The average annual reduction in hay consumed per head from 1940 through 1955 was about 21 pounds.

For nonfarm horses and mules it was assumed that up to 1931 the quantities of grain and hay consumed per head per year were a third more than those consumed by farm work animals. Since then the computations have rounded out to 1 million acres for producing feed for nonfarm horses and mules.

United States average yields of corn, oats, and all hay were used to determine the acreages required to grow the feed consumed by all horses and mules. From 1910 to 1950, average yields for each 5-year period were used to convert quantities of feed to acreages for each of the 5 years. From 1950 through 1955, average yields for the particular year and the previous 4 years were used.

Basic data on horse and mule numbers and average crop yields are from publications of the Crop Reporting Board of the Agricultural Marketing Service. The horse and mule rations are based on data from many sources, especially from a publication of the former Bureau of Agricultural Economics 1/, and on judgment of workers familiar with the subject.

1/ Brodell, A. P., and Jennings, R. D. Work Performed and Feed Utilized by Horses and Mules, U. S. Bur. Agr. Econ. F.M. 44. 1944.

Table 3.- Acreages of harvested crops used for specified purposes, United States, 1910-55 1/

Year	Crops harvested 2/	Acreage used for producing export products 3/	Acreage used for producing: Feed for horses and mules 4/		Products for domestic use 5/		Total population July 1 6/
			On farms	In cities, mines, etc.	Total	Per capita	
	Million acres	Million acres	Million acres	Million acres	Million acres	Acres	Millions
1910	325	37	72	16	200	2.17	92
1911	330	40	75	15	200	2.13	94
1912	329	42	76	15	196	2.06	95
1913	333	43	77	15	198	2.04	97
1914	334	57	78	14	185	1.87	99
1915	340	49	79	14	198	1.96	101
1916	340	53	79	13	195	1.91	102
1917	349	44	80	12	213	2.07	103
1918	362	62	81	11	208	1.98	105
1919	364	56	81	10	217	2.07	105
1920	360	60	80	10	210	1.98	106
1921	359	66	79	8	206	1.89	109
1922	355	50	79	7	219	1.99	110
1923	354	47	78	6	223	1.99	112
1924	355	53	76	5	221	1.94	114
1925	360	44	74	4	238	2.05	116
1926	359	54	72	4	229	1.96	117
1927	358	49	70	3	236	1.98	119
1928	361	49	68	2	242	2.00	121
1929	365	44	65	2	254	2.08	122
1930	369	39	63	2	265	2.15	123
1931	365	36	61	1	267	2.15	124
1932	371	35	59	1	276	2.21	125
1933	340	28	58	1	253	2.01	126
1934	304	20	56	1	227	1.80	126
1935	345	20	55	1	269	2.12	127
1936	323	18	53	1	251	1.96	128
1937	347	29	51	1	266	2.06	129
1938	349	22	47	1	279	2.15	130
1939	330	23	44	1	262	2.00	131
1940	339	14	42	1	282	2.14	132
1941	342	13	39	1	289	2.17	133
1942	346	16	38	1	291	2.16	135
1943	356	24	36	1	295	2.15	137
1944	361	23	35	1	302	2.19	138
1945	354	39	31	1	283	2.02	140
1946	351	46	28	1	276	1.96	141
1947	354	49	25	1	279	1.94	144
1948	356	44	23	1	288	1.96	147
1949	360	52	21	1	286	1.92	149
1950	345	37	18	1	289	1.90	152
1951	344	54	17	1	272	1.77	154
1952	349	43	14	1	291	1.85	157
1953	348	34	12	1	301	1.88	160
1954	346	33	10	1	302	1.86	162
1955 7/	340	36	9	1	294	1.78	165

1/ Acreages for producing export products and horse and mule feed include acreages used to produce the seed used to grow the crops exported and the feed used to produce export livestock products and to keep horses and mules.

2/ Area in crops harvested (excluding duplication) plus acreages in fruits, tree nuts, and farm gardens.

3/ Acreages for crop exports from 1910 to 1939 relate to exports for year beginning July 1, or month representing beginning of crop season. Acreages for producing livestock exports from 1910 to 1939 relate to livestock products exported during the specified year, beginning July 1. Acreages for crop exports and lend lease, beginning with 1940, are for calendar years as are livestock exports and lend lease.

4/ Feed computations for farm horses and mules assume decreasing quantities of grain per head since 1920 and decreasing quantities of hay per head since 1940. From 1931 on, the acreage required to feed all nonfarm horses and mules has rounded to 1 million acres.

5/ Includes products used by our military forces in this country and abroad, and by our domestic civilian population.

6/ Includes persons in our military forces in this country and abroad.

7/ Preliminary.

CROPLAND USED FOR CROPS AND CROP PRODUCTION PER ACRE

The series on cropland used for crops is made up of three components - acres of harvested cropland (land from which one or more crops were harvested), crop failure, and summer fallow. Idle cropland is not included, as the series is intended to measure changes in the land area in crops or being prepared for crops the following year. Land in soil-improvement crops during the entire year and not harvested is omitted also.

Reports of the United States Census of Agriculture and the series on principal crops harvested prepared by the Crop Reporting Board of the Agricultural Marketing Service were used in building up the series on harvested cropland. Census reports of harvested cropland were used for census years, and interpolations for intervening years were based on the Agricultural Marketing Service series on principal crops harvested.

Data on acreages of crop failure were developed similarly. Census reports of acreage of crop failure were used for census years, and interpolations for intervening years were based chiefly on differences between planted and harvested acreages of principal crops as estimated by the Agricultural Marketing Service.

Estimates of acreage of summer fallow were made only for the geographic divisions that lie west of the Mississippi River. Since 1944, estimates of fallow have been based on data contained in an annual report of the Great Plains Council, on the 1949 Census of Agriculture, and on data from the 1951 Productive Capacity Study. 2/ Estimates for earlier years were built up from fragmentary data available in the former Bureau of Agricultural Economics.

Index numbers of total crop production were divided by indexes of cropland used for crops to derive indexes of crop production per acre. Indexes of crop production were developed as one step in the calculation of farm output. An explanation of the series on crop production is given elsewhere in this report.

The index of crop production per acre differs from the index of crop yields per acre of 28 crops, prepared by the Crop Reporting Board of the Agricultural Marketing Service. The latter index is computed from yields of 18 field crops per acre harvested and yields

---

2/ Great Plains Council. Report of Conditions in the Great Plains. Annual; U. S. Bureau of the Census. 1950 Census of Agriculture; U. S. Bureau of Agricultural Economics. Agriculture's Capacity to Produce. U. S. Dept. Agr., Agr. Inform. Bul. 88. 1952.

of 10 fruits per acre of bearing age. The yields are combined in proportion to the relative values of the crops during the 1947-49 period. Thus, the crop-yield index uses constant-value weights for each of the 28 crops throughout the period 1910 to date. In contrast, the index of crop production per acre gives a variable weight to individual crops in each year according to the relative production importance (as measured in either 1935-39 or 1947-49 prices) of the crops in that particular year.

The yield index of 28 crops is computed on a basis of harvested or bearing acreage. The index of crop production per acre is computed on the basis of cropland used for crops.

Table 4.- Index numbers of cropland used for crops, and crop production per acre, United States, 1910-55
(1947-49 = 100)

Year	Cropland used for crops 1/	Crop production per acre	Year	Cropland used for crops 1/	Crop production per acre
1910	87	79	1935	100	76
1911	89	75	1936	99	65
1912	89	87	1937	100	88
1913	90	76	1938	98	85
1914	90	83	1939	96	85
1915	92	85	1940	97	88
1916	92	76	1941	96	90
1917	94	80	1942	97	100
1918	98	77	1943	100	91
1919	99	77	1944	100	96
1920	97	86	1945	98	95
1921	97	73	1946	97	101
1922	96	79	1947	98	95
1923	96	79	1948	100	106
1924	96	79	1949	102	99
1925	98	80	1950	99	98
1926	98	82	1951	100	99
1927	98	81	1952	100	103
1928	99	83	1953	101	102
1929	100	79	1954 2/	100	101
			1955 2/	100	105
1930	101	75			
1931	101	83			
1932	101	79			
1933	100	71			
1934	99	59			

1/ Cropland used for crops is the sum of the acreage of land from which one or more crops were harvested plus acreages of crop failure and summer fallow.

2/ Preliminary releases of the 1954 Census of Agriculture were used in revising the index for 1954 and in preparing the preliminary index for 1955. Revisions for cropland used for crops, 1950-53, and for crop production per acre, 1950-55, are not yet available.

Table 5.- Index numbers of cropland used for crops, by geographic divisions, 1919-55 1/
(1947-49 = 100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
1919	147	139	109	92	122	117	96	63	92	99
1920	144	137	107	91	116	111	96	69	90	97
1921	142	134	106	92	112	111	96	70	88	97
1922	140	134	105	92	109	112	94	69	88	96
1923	136	131	105	92	106	109	97	73	88	96
1924	134	130	102	92	105	106	102	70	88	96
1925	133	127	101	93	108	110	103	74	89	98
1926	131	123	99	95	107	110	105	77	89	98
1927	129	120	97	96	106	106	108	81	89	98
1928	127	115	96	97	105	107	111	83	91	99
1929	125	112	95	98	104	109	112	85	93	100
1930	123	110	96	99	106	110	113	85	93	101
1931	122	110	99	97	109	117	114	84	93	101
1932	122	110	97	99	108	117	114	83	95	101
1933	123	110	95	96	110	107	115	83	93	100
1934	126	112	96	94	107	111	114	83	91	99
1935	124	113	98	95	110	111	112	82	95	100
1936	122	110	97	95	108	111	110	83	96	99
1937	123	110	99	94	113	117	111	80	98	100
1938	118	108	96	94	110	112	110	79	96	98
1939	118	105	92	91	109	113	106	80	94	96
1940	112	106	93	92	108	112	109	80	94	97
1941	113	106	94	93	105	110	106	81	93	96
1942	117	107	96	93	107	112	106	82	97	97
1943	124	108	98	98	108	109	102	88	97	100
1944	129	112	102	99	105	102	101	89	96	100
1945	120	110	100	98	102	100	96	91	96	98
1946	114	107	100	97	99	98	96	91	96	97
1947	106	101	98	98	101	99	99	96	97	98
1948	100	101	101	99	99	100	100	98	98	100
1949	94	98	101	103	100	101	101	106	105	102
1950	93	97	100	101	96	94	91	103	105	99
1951	92	97	101	102	97	93	93	108	104	100
1952	92	97	101	102	99	92	93	111	106	100
1953	91	96	102	102	99	92	91	112	107	101
1954 2/	84	95	102	104	92	87	94	112	102	100
1955 2/	84	95	101	104	91	87	92	113	100	100

1/ Cropland used is the sum of the acreage of land from which one or more crops were harvested, plus acreages of crop failure and summer fallow.

2/ Preliminary releases of the 1954 Census of Agriculture were used in revising the index for 1954 and in preparing the preliminary index for 1955. Revisions for 1950-53 are not yet available.

Table 6.- Index numbers of crop production per acre, by geographic divisions, 1919-55 1/
(1947-49 = 100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
1919	63	73	75	84	66	70	86	68	53	77
1920	58	83	79	98	75	74	98	87	53	86
1921	60	67	68	87	59	66	74	84	53	73
1922	57	80	75	95	65	73	81	86	57	79
1923	65	73	76	92	71	66	75	89	64	79
1924	66	79	72	92	69	73	85	81	50	79
1925	65	76	81	90	69	80	78	86	57	80
1926	65	78	79	76	78	85	100	82	63	82
1927	64	77	71	94	75	72	79	96	65	81
1928	65	79	79	96	73	71	85	93	66	83
1929	71	75	75	88	79	82	78	82	66	79
1930	72	76	68	84	76	66	68	87	70	75
1931	74	88	85	77	80	85	96	68	65	83
1932	68	80	84	90	61	68	83	77	67	79
1933	71	79	67	69	72	77	70	71	67	71
1934	68	79	61	35	70	73	51	55	68	59
1935	68	87	84	73	78	71	68	73	74	76
1936	68	78	66	43	72	74	62	66	73	65
1937	74	91	90	79	84	95	94	81	79	88
1938	69	89	90	82	77	84	77	95	79	85
1939	73	90	97	81	87	74	76	82	80	85
1940	77	92	90	88	87	75	83	91	85	88
1941	75	88	97	94	76	83	79	104	88	90
1942	80	96	100	114	87	89	88	107	87	100
1943	82	84	91	99	83	88	79	103	89	91
1944	71	88	89	102	95	97	93	100	94	96
1945	77	86	97	101	96	97	78	96	94	95
1946	92	102	101	107	104	94	81	99	105	101
1947	94	97	87	92	100	94	94	102	101	95
1948	104	103	108	116	104	112	94	105	103	106
1949	102	100	105	92	96	94	112	93	96	99
1950	102	108	100	101	102	93	90	97	99	98
1951	95	106	103	92	115	99	91	94	106	99
1952	93	102	107	108	105	97	92	98	109	103
1953	100	105	108	96	106	105	100	105	107	102
1954	102	108	109	97	108	98	96	93	115	101
1955	111	103	115	96	120	117	102	98	115	105

1/ The 1950-55 indexes are subject to revisions after review of information from the 1954 Census of Agriculture and other data.

USE OF FERTILIZER AND LIME IN THE UNITED STATES

Data on consumption of fertilizer for the early years have been compiled from various sources, including State reports and annual estimates made by the National Fertilizer Association. The first fertilizer grade survey made by the Division of Fertilizer Investigations, in the former Bureau of Plant Industry, United States Department of Agriculture, in cooperation with the National Fertilizer Association was for the year ended June 30, 1934. Another joint survey was made 5 years later in the same way. This was followed by a fertilizer consumption report prepared by the Division of Soil and Fertilizer Investigations, in the former Bureau of Plant Industry and Soils, United States Department of Agriculture, for the calendar year 1941. Annual surveys were made by this division and subsequently by the Division of Fertilizer and Agricultural Lime in the former Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture (now Fertilizer and Agricultural Lime Section, Soil and Water Conservation Research Branch, Agricultural Research Service, United States Department of Agriculture) starting with the fiscal year ended June 30, 1943. These surveys are based on questionnaires sent to all manufacturers of fertilizer. In recent years, completed returns have been received from producers of more than 96 percent of all fertilizer used annually. Returns from the questionnaires are studied and correlated with State reports. Adjusted figures account for total use of fertilizer. The quantities of plant nutrients consumed are obtained by multiplying the tonnages of the different grades of separate materials and mixtures consumed in each State by the weighted average composition of the respective grade as obtained from annual State reports. The data are assembled and annual reports of consumption are published (1) in processed form by the United States Department of Agriculture and (2) in the national agricultural journals.

Estimates of use of lime for the continental United States were developed from various scurces by the National Agricultural Limestone Institute, Inc.

Table 7.- Use of principal plant nutrients and agricultural lime, United States, 1910-55

Year	Plant nutrients 1/		Agricultural lime 2/		Year	Plant nutrients 1/		Agricultural lime 2/	
	Quantity	Index 1947-49=100	Quantity	Index 1947-49=100		Quantity	Index 1947-49=100	Quantity	Index 1947-49=100
	1,000 tons		1,000 tons			1,000 tons		1,000 tons	
1910	856	23	946	3	1933	926	25	1,548	6
1911	938	26	1,116	4	1934	1,068	29	2,748	10
1912	900	25	1,286	5	1935	1,216	33	3,505	13
1913	988	27	1,456	5	1936	1,374	37	6,566	23
1914	1,115	30	1,626	6	1937	1,622	44	7,199	26
1915	802	22	1,796	6	1938	1,521	42	7,859	28
1916	729	20	1,966	7	1939	1,597	44	9,066	32
1917	842	23	2,136	8	1940	1,766	48	14,406	52
1918	888	24	2,306	8	1941	1,918	52	15,916	57
1919	948	26	2,476	9	1942	2,076	57	19,838	71
1920	1,145	31	2,653	9	1943	2,389	65	18,935	68
1921	791	22	2,794	10	1944	2,689	73	24,568	88
1922	933	25	2,935	10	1945	2,832	77	23,055	82
1923	1,058	29	3,076	11	1946	3,286	90	29,462	105
1924	1,141	31	3,217	12	1947	3,490	95	30,283	108
1925	1,242	34	3,359	12	1948	3,640	99	25,686	92
1926	1,267	35	3,330	12	1949	3,860	106	27,902	100
1927	1,217	33	3,798	14	1950	4,413	120	29,842	107
1928	1,451	40	3,806	14	1951	4,769	130	26,931	96
1929	1,464	40	3,907	14	1952	5,312	145	26,562	95
1930	1,524	42	3,588	13	1953	5,576	152	20,669	74
1931	1,187	32	2,611	9	1954	5,896	161	18,975	68
1932	818	22	1,811	6	1955	3/ 6,047	165	4/	

1/ N, P_2O_5, and K_2O. Data from Soil and Water Conservation Research Branch, ARS. For calendar years, except for 1954 and 1955 which are for years ending June 30. United States and territories.

2/ Data from National Agricultural Limestone Institute, Inc. Continental United States only.

3/ Preliminary estimate.

4/ Data not available.

Table 8.- Use of fertilizer in terms of principal plant nutrients, United States, by regions, 1930-55 1/

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States	Territories	U. S. and territories
	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons	Thousand tons
1930	77	149	164	21	713	220	76	4	35	1,459	65	1,524
1931	76	138	130	18	549	136	46	5	32	1,130	57	1,187
1932	64	115	77	9	374	70	18	3	30	760	58	818
1933	59	114	88	8	443	93	22	3	29	859	67	926
1934	66	124	110	16	494	118	33	5	37	1,003	65	1,068
1935	65	144	144	18	552	144	38	5	44	1,154	62	1,216
1936	69	157	171	26	606	170	46	7	53	1,305	69	1,374
1937	79	184	183	27	708	233	61	12	60	1,547	75	1,622
1938	79	179	171	26	653	212	59	12	56	1,447	74	1,521
1939	84	184	176	26	677	232	66	11	64	1,520	77	1,597
1940	88	200	220	32	688	287	79	12	73	1,679	87	1,766
1941	108	228	247	41	724	293	93	16	85	1,835	83	1,918
1942	108	242	333	55	779	314	95	16	79	2,021	55	2,076
1943	117	254	342	67	936	368	126	20	101	2,331	58	2,389
1944	125	292	422	99	960	403	136	30	143	2,610	79	2,689
1945	131	298	479	119	984	402	136	34	162	2,745	87	2,832
1946	133	314	564	166	1,120	461	186	47	212	3,203	83	3,286
1947	126	312	636	205	1,130	503	214	51	220	3,397	93	3,490
1948	127	311	747	261	1,075	546	233	54	188	3,542	98	3,640
1949	139	339	739	267	1,181	592	260	49	201	3,767	93	3,860
1950	124	350	870	355	1,252	667	333	75	262	4,288	125	4,413
1951	119	366	992	417	1,324	694	351	94	283	4,640	129	4,769
1952	127	392	1,179	516	1,416	780	394	100	306	5,210	102	5,312
1953	121	397	1,328	649	1,423	709	381	123	335	5,466	110	5,576
1954	111	407	1,401	759	1,458	750	412	126	355	5,779	117	5,896
1955	124	548	1,397	815	1,355	738	426	128	397	5,928	119	6,047

1/ N, P_2O_5, and K_2O. Data from Soil and Water Conservation Research Branch, ARS. For calendar years, except for 1954 and 1955 which are for years ending June 30. Data for 1955 are preliminary.

Table 9.- Index numbers of use of fertilizer in terms of principal plant nutrients, United States, by regions, 1930-55

(1947-49=100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	Continental United States	Territories	United States and territories
1930	59	46	23	9	63	40	32	8	17	41	69	42
1931	58	43	18	7	49	25	19	10	16	32	61	32
1932	49	36	11	4	33	13	8	6	15	21	62	22
1933	45	36	12	3	39	17	9	6	14	24	71	25
1934	50	39	16	7	44	22	14	10	18	28	69	29
1935	50	45	20	7	49	26	16	10	22	32	66	33
1936	53	49	24	11	54	31	19	14	26	37	73	38
1937	60	57	26	11	63	43	26	24	30	43	80	44
1938	60	56	24	11	58	39	25	24	28	41	79	42
1939	64	57	25	11	60	42	28	22	32	43	82	44
1940	67	62	31	13	61	52	33	24	36	47	93	48
1941	82	71	35	17	64	54	39	31	42	51	88	52
1942	82	75	47	23	69	57	40	31	39	57	59	57
1943	89	79	48	27	83	67	53	39	50	65	62	65
1944	95	91	60	41	85	74	58	59	70	73	84	73
1945	100	93	68	49	87	73	58	67	80	77	93	77
1946	102	98	80	68	99	84	79	92	104	90	88	90
1947	97	97	90	84	100	92	91	99	108	95	98	95
1948	97	97	106	107	95	100	99	105	93	99	104	99
1949	106	106	104	109	105	108	110	96	99	106	98	106
1950	95	109	123	145	111	122	141	147	129	120	133	120
1951	91	114	140	171	117	127	149	184	139	130	137	130
1952	97	122	167	211	125	143	167	196	151	146	109	145
1953	92	124	188	266	126	130	161	241	165	153	117	152
1954	85	127	198	311	129	137	175	247	175	162	124	161
1955 1/	95	171	198	334	120	135	181	251	196	166	127	165

1/ Preliminary.

ANIMAL UNITS OF BREEDING LIVESTOCK AND LIVESTOCK PRODUCTION PER BREEDING UNIT

The index of animal units of breeding livestock is based on numbers of milk cows, beef cows, ewes, hens and pullets, and sows and gilts on January 1, the number of goats clipped, the total number of turkeys on January 1 for 1939 and prior years, and the number of turkey breeder hens on January 1 for 1940 and subsequent years.

Two weight periods were used to combine the numbers of the various types of breeding units into a total. Average contributions of each breeding unit to livestock production in 1935-39 were the weights used for 1939 and prior years. Weights based on contributions to livestock production in 1947-49 were used for the period 1940 to date. The two subperiods were "spliced" together in 1940 by using overlapped calculations for that year.

The weighting system can be illustrated for the 1935-39 weight period. On an average in these years, a milk cow produced, in terms of 1935-39 average prices, about $80 worth of livestock products; a hen or pullet contributed about $2.50. These value weights were applied to numbers of milk cows, and hens and pullets, respectively, in calculating the index of animal units of breeding livestock each year from 1919 to 1939.

An index of livestock production per breeding unit was obtained by dividing an index of livestock production by the index of animal units of breeding livestock. The index of livestock production used was the one derived in the calculation of farm output. An explanation of the latter series is given elsewhere in this report.

Table 10.- Index numbers of animal units of breeding livestock and livestock production per breeding unit, United States, 1919-55 1/
(1947-49 = 100)

Year	Animal units of breeding livestock	Livestock production per breeding unit
1919	97	68
1920	94	68
1921	93	71
1922	97	73
1923	102	73
1924	98	74
1925	92	77
1926	92	80
1927	94	81
1928	94	81
1929	92	84
1930	92	85
1931	93	86
1932	95	85
1933	98	84
1934	98	77
1935	86	84
1936	90	86
1937	87	87
1938	87	91
1939	93	91
1940	95	92
1941	94	98
1942	104	98
1943	117	95
1944	114	92
1945	108	96
1946	107	94
1947	103	97
1948	98	99
1949	99	104
1950	102	104
1951	104	107
1952	104	108
1953	103	111
1954 2/	104	112
1955 2/	106	114

1/ Animal units and production exclude horses and mules.
2/ Basic data for animal units of breeding livestock and livestock production per unit for 1954 and 1955 were revised on the basis of information from the 1954 Census of Agriculture and other data. Data for 1955 are preliminary.

MAN-HOURS OF FARMWORK

The series of man-hours of farm labor measure the labor input in farming. The hours are expressed in man-equivalent hours, that is, the time used by average adult male workers in performing farm jobs. As many farmworkers accomplish less than average adult males, the total of actual hours of farmwork in any given year exceeds the total of man-equivalent hours. The series were developed for each year by geographic divisions, beginning with 1919, and for the United States, beginning with 1910. They are built up by individual farm enterprises by applying average man-hours per acre of crops and per head or unit of production of livestock to the official estimates of acres and numbers reported by the Crop Reporting Board of the Agricultural Marketing Service.

Time for farm maintenance or general overhead work is calculated separately and added to the direct hours for crops and livestock used in arriving at the total number of man-hours. Estimates of annual man-hours per acre or per head are made by interpolating between or extrapolating from benchmarks.

Benchmarks consist of estimates of labor used per acre and per head in each State converted to a geographic-division basis. These State estimates for 1939, 1944, and 1950 may be found in two reports of the former Bureau of Agricultural Economics and in a report of the Production Economics Research Branch, Agricultural Research Service. 3/ Similar benchmarks for 1910, 1919, and 1929 were developed from data in the Works Progress Administration National Research Project reports which were summarized in a report issued by the former Bureau of Agricultural Economics. 4/ These reports were based on extensive field surveys, while the first-mentioned group of studies were based on secondary data such as are reported in State experiment station bulletins and studies of changes in farm practices and mechanization.

The interpolation of man-hours per acre or per animal between benchmarks and extrapolation beyond benchmarks are modified by several factors. For crops, these include such items as yields per acre, utilization of the crop, methods of harvest, and source of power as indicated by numbers of tractors and workstock on farms. For livestock, the modifiers include such factors as size of enterprise, production per animal, such as milk per cow or eggs per hen, and extent of different methods and practices followed, such as use of milking machines.

3/ Cooper, M. R., Holley, W. C., and others. Labor Requirements for Crops and Livestock. U. S. Bur. Agr. Econ. F.M. 40, 1943; Hecht, Reuben W. Labor Requirements in the United States, 1939 and 1944. U. S. Bur. Agr. Econ. F.M. 59, 1947; Hecht, Reuben W. and Vice, Keith R., Labor Used for Field Crops. U. S. Dept. Agr. Statis. Bul. 144, 1954; and Hecht, Reuben W. Labor Used for Livestock. U. S. Dept. Agr. Statis. Bul. 161. 1955.

4/ U. S. Works Progress Administration. Changing Technology and Employment in Agriculture. Bur. Agr. Econ. 1941.

Table 11.- Man-hours of labor used for farmwork, United States, 1910-55

Year	Man-hours		Year	Man-hours	
	Total	Index (1947-49 = 100)		Total	Index (1947-49 = 100)
	Million hours			Million hours	
1910	22,547	132	1935	21,052	123
1911	23,017	135	1936	20,440	120
1912	23,319	136	1937	22,097	129
1913	23,023	135	1938	20,577	120
1914	23,727	139	1939	20,680	121
1915	23,244	136	1940	20,443	120
1916	23,107	135	1941	20,049	117
1917	23,751	139	1942	20,849	122
1918	24,073	141	1943	20,682	121
1919	23,629	138	1944	20,482	120
1920	23,995	140	1945	19,108	112
1921	22,135	130	1946	18,423	108
1922	22,900	134	1947	17,593	103
1923	23,061	135	1948	17,116	100
1924	23,323	136	1949	16,563	97
1925	23,800	139	1950	15,227	89
1926	23,878	140	1951	15,632	91
1927	22,948	134	1952	15,241	89
1928	23,356	137	1953	15,102	88
1929	23,158	136	1954 1/	14,642	86
			1955 1/	14,609	85
1930	22,921	134			
1931	23,427	137			
1932	22,605	132			
1933	22,554	132			
1934	20,232	118			

1/ Basic data for livestock 1954-55 were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

Table 12.-Index numbers of man-hours of labor used for farmwork by groups of enterprises, United States, 1910-55
(1947-49 = 100)

Year	All farm work	Livestock						Crops 1/									
		Total including horses and mules	Total excluding horses and mules	Meat animals 2/	Milk cows	Poultry	Horses and mules	All crops	Feed grains	Hay and forage	Food grains	Vegetables	Fruits and nuts	Sugar crops	Cotton	Tobacco	Oil crops
1910	132	107	85	80	91	69	342	150	233	138	188	90	105	137	177	65	27
1911	135	108	85	81	91	67	352	154	222	121	198	89	112	145	212	53	31
1912	136	109	85	84	91	65	358	157	234	159	197	94	111	136	191	63	35
1913	135	110	87	88	91	69	363	153	216	143	206	92	99	144	202	58	28
1914	139	112	88	91	92	70	369	158	216	154	220	94	115	129	214	59	28
1915	136	114	90	93	94	71	374	152	228	169	237	95	109	138	165	66	29
1916	135	115	91	94	96	69	374	150	215	179	193	94	103	150	175	69	37
1917	139	116	92	95	98	68	378	156	242	162	185	104	96	187	171	75	50
1918	141	118	93	97	99	70	383	158	222	159	242	103	98	183	183	81	51
1919	138	116	91	87	99	73	384	154	212	177	266	98	98	168	172	86	40
1920	140	114	90	81	99	71	377	160	223	176	227	103	103	181	185	91	44
1921	130	115	91	85	99	71	372	140	220	163	216	98	88	172	134	60	40
1922	134	117	94	91	102	75	367	146	207	178	222	108	108	139	149	74	36
1923	135	119	96	92	104	79	361	147	204	168	190	102	107	133	163	88	41
1924	136	118	97	89	105	82	351	150	194	168	174	105	102	131	192	76	56
1925	139	117	96	84	106	82	340	155	201	141	161	106	101	121	220	83	50
1926	140	117	97	85	106	84	329	157	194	141	165	105	111	116	230	78	45
1927	134	117	98	86	106	88	316	147	191	176	170	107	101	109	182	78	54
1928	137	116	99	87	107	88	305	152	193	151	166	108	108	105	200	88	54
1929	136	116	100	86	109	86	294	150	183	155	150	109	103	116	203	95	55
1930	134	117	102	87	112	89	282	146	180	132	151	111	104	123	193	103	54
1931	137	119	105	91	117	85	269	151	194	135	147	110	110	128	198	94	61
1932	132	120	107	92	122	84	257	141	197	149	135	112	102	143	166	62	63
1933	132	123	111	96	127	86	248	139	181	136	122	107	101	159	173	86	54
1934	118	119	108	84	127	83	239	118	157	115	115	110	99	147	122	66	62

1935	123	113	102	77	123	77	229	130	174	164	132	115	107	144	127	80	71
1936	120	114	104	84	120	83	218	124	156	123	126	110	94	139	141	74	71
1937	129	112	102	82	119	82	209	142	166	139	151	114	107	141	184	94	67
1938	120	111	103	87	118	79	198	127	162	159	148	114	99	151	123	84	74
1939	121	114	107	96	119	86	191	126	155	153	119	113	103	144	121	113	87
1940	120	114	108	97	119	89	184	124	153	166	115	113	101	128	122	80	98
1941	117	116	110	102	120	92	176	118	149	161	117	113	105	127	107	72	96
1942	122	121	117	115	122	103	166	123	150	160	105	115	103	147	116	79	151
1943	121	125	122	125	122	119	157	118	146	153	98	117	97	120	104	82	153
1944	120	122	120	115	121	123	148	118	142	147	108	114	103	117	103	102	131
1945	112	117	115	108	116	119	137	108	127	140	106	112	99	124	80	106	126
1946	108	111	109	105	110	113	126	106	120	122	101	113	107	124	75	117	113
1947	103	104	104	102	105	103	113	102	102	111	107	102	103	117	90	110	115
1948	100	99	98	98	99	98	100	101	105	100	100	101	99	96	103	94	104
1949	97	97	98	100	96	99	87	97	93	89	93	97	98	87	107	96	81
1950	89	96	98	103	94	101	76	84	85	87	73	95	98	96	65	97	77
1951	91	96	98	108	92	102	70	88	74	88	74	91	100	74	93	109	72
1952	89	95	98	109	91	103	62	85	68	86	76	89	96	74	89	108	64
1953	88	95	99	109	93	101	56	84	65	87	73	91	95	76	88	99	64
1954 3/	86	94	99	114	92	97	48	79	68	85	62	90	96	80	70	103	67
1955 3/	85	94	99	118	91	94	43	79	69	91	56	90	96	73	70	96	72

1/ For crops included in each group see table 1, footnotes 7 to 14.
2/ For livestock included see table 1, footnote 3.
3/ Basic data for livestock 1954-55 were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

Note: Supplement II to this publication contains a similar table for each geographic division. See Preface.

Table 13.- Index numbers of man-hours of labor used for farmwork, by geographic divisions, 1919-55

(1947-49 = 100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
1919	154	163	149	147	131	128	155	113	92	138
1920	148	165	148	147	132	124	168	123	91	140
1921	147	153	140	145	112	117	144	124	88	130
1922	146	159	144	153	111	124	150	122	94	134
1923	146	153	144	154	113	118	155	128	97	135
1924	143	154	141	155	112	120	170	126	89	136
1925	140	150	141	152	118	131	172	130	95	139
1926	134	144	138	145	121	133	183	129	98	140
1927	131	140	133	152	116	119	163	134	99	134
1928	128	137	135	151	116	123	173	136	102	137
1929	127	134	130	149	119	130	166	132	103	136
1930	129	133	129	148	121	125	159	134	106	134
1931	131	138	136	145	119	135	171	126	101	137
1932	129	136	134	150	105	125	162	125	102	132
1933	130	134	131	143	115	126	161	124	99	132
1934	128	132	126	121	107	117	127	114	100	118
1935	128	135	131	129	114	116	132	115	103	123
1936	126	129	125	119	110	119	132	115	105	120
1937	129	132	131	123	121	135	152	118	110	129
1938	125	128	127	122	109	119	130	117	106	120
1939	126	130	127	122	119	115	128	114	105	121
1940	125	128	126	123	111	112	129	117	106	120
1941	122	125	125	125	103	111	123	120	106	117
1942	124	126	127	131	111	117	129	123	105	122
1943	126	122	125	133	111	116	124	123	107	121
1944	125	123	123	129	114	115	121	119	107	120
1945	118	115	117	120	109	107	105	113	105	112
1946	114	113	113	113	109	102	99	107	107	108
1947	106	104	103	105	105	100	100	103	103	103
1948	100	100	101	100	100	104	97	100	99	100
1949	94	96	96	95	95	96	103	97	98	97
1950	90	93	91	91	91	86	81	92	94	89
1951	87	91	89	89	99	88	87	95	100	91
1952	87	89	88	87	95	87	82	94	99	89
1953	90	90	88	86	93	87	81	95	97	88
1954 1/	88	89	86	87	90	79	75	95	97	86
1955 1/	88	88	86	86	90	79	75	94	99	85

1/ Basic data for livestock 1954-55 were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

FARM LABOR PRODUCTIVITY

Index numbers of farm output and production by groups of enterprises are divided by the appropriate indexes of man-hours of labor input in computing index numbers of production per man-hour.

The indexes of labor productivity reflect the net effect of all factors that affect either farm production or labor input. It would not be correct to attribute all the changes in efficiency to farm labor. Labor is one of the most important inputs in agricultural production, however, and changes in the ratio of production to labor provide a useful measure of changes in efficiency of farm production. But changes in production per man-hour of labor must be interpreted in the light of changes in mechanization, yields of crops and livestock, and the other technological forces that operate on labor input and farm production.

The Bureau of Labor Statistics, United States Department of Labor, also calculates an index of labor productivity in agriculture. But it differs significantly from the series presented in this report. First the Bureau of Labor Statistics' index is based on production per farm worker and consequently it is computed for total farm production only. In contrast, the indexes presented in this report are developed for several groups of farm enterprises. Second, the production index used by the Bureau of Labor Statistics is constructed by weighting data on production of farm commodities with estimates of unit man-hour requirements to produce each product in the base period. The Agricultural Research Service uses a production index that is based on constant price weights. There are also differences in coverage between the 2 indexes. A more detailed explanation of the differences between the 2 indexes of production and the 2 labor-productivity series may be found in a report of the Bureau of Labor Statistics. 5/

5/ U. S. Bureau of Labor Statistics. Productivity Trends 1909 to 1950. Agriculture. 1952.

a 14.- Index numbers of farm production per man-hour, by groups of enterprises, United States, 1910-55

(1947-49 = 100).

Year	Farm output	Livestock and products 1/				Crops 2/									
		All livestock and products	Meat animals	Milk cows	Poultry	All crops	Feed grains	Hay and forage	Food grains	Vege-tables	Fruits and nuts	Sugar crops	Cotton	Tobacco	Oil crops
1910	46	71	82	64	68	46	39	54	28	64	50	58	46	85	33
1911	44	72	81	65	73	44	35	52	26	62	58	61	52	85	39
1912	49	72	81	65	72	49	41	52	30	67	62	58	50	86	49
1913	44	72	81	67	68	44	35	52	30	64	54	60	50	83	39
1914	47	73	81	66	67	47	38	52	33	66	67	60	53	85	36
1915	50	74	83	67	69	51	42	53	34	65	66	58	48	85	34
1916	46	73	82	66	68	47	37	54	28	62	63	58	46	84	32
1917	47	73	81	65	69	48	40	52	29	66	58	55	46	85	28
1918	47	73	82	65	69	47	38	52	31	65	62	56	46	86	29
1919	48	73	84	67	68	49	41	53	30	64	64	53	47	81	30
1920	50	71	84	66	69	52	45	52	31	68	71	59	51	80	34
1921	48	73	84	69	72	51	41	52	31	66	55	59	42	82	32
1922	51	76	87	69	73	52	42	54	32	69	73	57	46	81	36
1923	51	77	88	69	73	52	45	54	33	71	74	60	44	84	39
1924	50	75	88	70	70	51	40	55	40	70	72	59	49	80	45
1925	50	74	87	72	71	50	45	56	34	68	67	64	51	81	42
1926	52	76	88	73	74	51	43	56	41	70	80	63	55	81	42
1927	54	78	91	75	73	54	45	56	42	73	67	68	50	78	46
1928	55	77	90	75	70	54	47	56	44	75	75	69	50	77	41
1929	54	77	90	75	73	53	45	57	44	74	74	66	51	79	38
1930	54	76	90	75	73	52	41	57	48	74	72	72	51	79	43
1931	58	76	90	74	74	56	43	59	52	75	85	65	60	81	38
1932	58	76	90	70	75	57	48	58	46	74	75	67	55	79	33
1933	53	74	90	69	72	51	40	58	37	75	76	68	53	79	33
1934	51	69	87	67	71	49	31	58	38	79	73	61	56	82	34

1935	59	71	86	70	77	58	46	59	40	77	85	66	59	81	48
1936	54	74	88	72	76	52	34	60	41	75	77	72	62	78	38
1937	64	75	87	72	77	62	52	63	48	78	89	72	72	83	45
1938	66	77	89	75	82	65	52	62	51	78	86	79	68	82	49
1939	66	79	91	76	80	65	54	61	51	78	95	77	69	83	54
1940	69	81	92	77	79	69	56	64	58	81	94	84	72	90	57
1941	74	84	92	80	84	73	61	66	65	81	97	80	70	86	64
1942	79	87	93	82	86	79	69	72	76	83	97	80	78	89	61
1943	78	91	96	81	86	77	66	72	70	88	90	72	77	85	64
1944	81	88	94	83	83	81	70	74	79	87	99	73	83	94	63
1945	86	90	95	89	89	86	76	81	84	90	94	77	79	92	70
1946	91	93	96	93	88	92	88	85	91	97	103	85	81	97	75
1947	92	96	98	96	95	91	79	92	101	96	101	95	93	95	77
1948	104	99	99	99	98	105	110	100	103	102	97	96	101	104	102
1949	104	105	103	105	107	104	111	108	96	102	102	109	106	101	121
1950	112	108	104	107	110	115	122	121	114	106	104	122	108	104	151
1951	113	113	106	109	117	112	131	125	109	104	105	126	114	106	147
1952	120	114	106	111	119	121	150	122	138	108	106	128	119	104	162
1953	123	115	105	114	126	123	155	124	132	110	109	139	131	103	159
1954 3/	126	118	106	116	129	128	154	126	137	109	109	148	137	108	173
1955 3/	132	122	108	119	131	133	162	124	143	112	108	151	147	114	179

1/ For livestock included in each group see table 1, footnotes 2 to 5.

2/ For crops included in each group see table 1, footnotes 7 to 14.

3/ Basic data for livestock 1954-55 were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

Note: Supplement III to this publication contains a similar table for each geographic division. See Preface.

Table 15.- Index numbers of farm output per man-hour, by geographic divisions, 1919-55

(1947-49=100)

Year	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
1919	49	50	46	44	53	55	46	39	51	48
1920	47	53	47	49	57	57	47	46	51	50
1921	48	48	44	46	51	55	43	47	52	48
1922	47	54	47	49	56	58	41	47	52	51
1923	50	52	49	49	58	54	41	49	56	51
1924	52	55	48	48	57	57	44	47	51	50
1925	51	55	51	49	57	60	40	48	54	50
1926	53	57	51	47	60	63	48	50	57	52
1927	53	57	49	53	61	59	45	55	60	54
1928	55	58	52	55	60	57	47	55	60	55
1929	59	57	52	53	62	62	46	53	60	54
1930	59	59	50	53	60	54	43	55	61	54
1931	60	62	57	51	66	67	56	51	61	58
1932	58	60	57	55	59	60	53	54	64	58
1933	59	60	50	48	63	62	47	52	63	53
1934	60	62	49	36	65	65	45	49	63	51
1935	60	64	58	50	69	66	52	56	68	59
1936	62	63	53	39	66	66	50	54	68	54
1937	64	68	63	56	72	76	62	58	69	64
1938	63	69	64	59	72	75	62	65	72	66
1939	66	68	67	60	74	70	62	62	72	66
1940	67	70	66	64	79	71	67	66	75	69
1941	69	71	71	69	76	78	67	72	78	74
1942	74	77	76	79	82	83	73	75	82	79
1943	79	75	75	76	81	83	70	78	83	78
1944	75	80	76	78	87	86	80	80	87	81
1945	81	84	84	83	90	90	78	82	89	86
1946	89	91	88	90	94	90	84	88	94	91
1947	93	94	87	89	95	94	94	96	95	92
1948	101	101	104	109	102	106	98	102	101	104
1949	106	105	109	103	103	100	108	102	104	104
1950	112	114	112	114	111	106	109	110	111	112
1951	113	118	119	112	116	109	105	109	110	113
1952	114	119	125	128	115	109	113	118	116	120
1953	117	121	127	122	120	120	121	124	120	123
1954 1/	114	124	131	125	120	122	132	117	124	126
1955 1/	118	123	137	127	131	141	137	122	120	132

1/ Basic data for livestock 1954-55 were revised on the basis of information from the 1954 Census of Agriculture and other data. Comparable revised data for crops are not yet available. Data for 1955 are preliminary.

NUMBER OF FARM MACHINES

The series on farm machines gives numbers of eight important machines on farms on January 1, or on a date specified. Each series is the number of the specified machine of all types, sizes, and ages. For example, an old automobile of 20 to 30 horsepower is counted as one just as a new automobile of more than 100 horsepower is counted as one; and an old machine that is used very little during the year counts as much in the series as a new machine of the same kind with heavy use.

Because of the varied nature of the machines included in each series, recent changes in numbers have more definite meaning than longtime changes. This is particularly true for tractors and automobiles and perhaps in a lesser degree for motortrucks. Since 1945, tractor numbers have been published for three classes of tractors--wheel, crawler, and garden. In recent years, a larger percentage of combines are of the smaller sizes, and a larger proportion are self-propelled. Cornpickers of one-row size are relatively more numerous now than they were several years ago. More farms with small dairy herds now have milking machines than in earlier years. Pickup balers and field forage harvesters may generally be assumed to be more efficient than those of earlier years.

Numbers of tractors, trucks, and automobiles for 1920, 1930, 1940, 1945, 1950, and 1955, except for tractors for 1940, are figures reported by the Censuses of Agriculture. Preliminary estimates of tractors, for noncensus years are made annually and adjusted when the census data become available. Prior to 1950, the number on farms for a given noncensus year was determined by adding to the number at the beginning of the year the number shipped for farm use by manufacturers, and an estimate of the number imported for farm use in that year, and subtracting an allowance for disappearance during the year. After the 1950 census, the chief basis for making the preliminary annual estimates has been the results of a mailed questionnaire to crop correspondents of the Crop Reporting Board, Agricultural Marketing Service, on tractor numbers on their farms.

For noncensus years, an adjustment was made in shipments of garden tractors to allow for those not going to farms. The adjustment assumed that in these years only about a fourth to a third of the shipments of garden tractors reported by the Industry Division, Bureau of the Census, actually go to farms. The rest are bought by nonfarm users. These percentages were determined by relating the total number shipped between 1945 and 1950 to the numbers on farms in these 2 years, as reported by the Census of Agriculture.

Numbers of automobiles and motortrucks for early noncensus years are based on annual registrations for a limited number of agricultural States and a few special sample surveys that were nationwide in scope. Since 1951,

additional data on numbers of automobiles and trucks on farms of crop reporters have been available.

The 1950 Census of Agriculture reports the number of grain combines and cornpickers on farms, and the number of farms having milking machines. The 1945 census contains the same information for combines and milking machines. In 1942, estimates were made of numbers of grain combines, cornpickers, and farms having milking machines from information supplied by crop correspondents. 6/ Estimates of numbers of combines on farms in 1920 and 1930 were made from data on the manufacture and sales of farm equipment, and from correspondence. 7/ These are the basic points from which estimates for dates prior to 1950 were made.

Since 1950, crop correspondents have reported numbers of combines on their farms. The 1910 estimates for combines are based on fragmentary information for California where most of the combines were at that time. For example, "Farm Implement News" estimated 500 to 600 combines in California in 1888. 8/ From 1940 to 1944 inclusive, the estimates are based on numbers shown for 1930, intermediate estimates by Hopkins, 9/ occasional data obtained in special surveys, and domestic sales since then, adjusted to be in line with numbers reported in the 1945 Agricultural Census. For years since 1945, preliminary estimates of combines are based on domestic sales, imports, and information obtained from crop correspondents. These estimates have been adjusted to census numbers shown in 1950 and in November 1954.

Numbers of cornpickers on farms and farms with milking machines have been estimated in a way similar to that used for estimating grain combines. Primary sources of information for these estimates are the estimates for 1942 reported in F.M. 46, domestic sales reported in Facts for Industry reports, 10/ the Agricultural Censuses of 1945, 1950 and November 1954, and data from crop correspondents for cornpickers since 1950, and for milking machines for 1952 and 1953. Early estimates for combines, cornpickers, and milking machines were adjusted from time to time as new data came to light or new studies were made.

6/ Brodell, A. P., and Cooper, M. R. Number and Duty of Principal Farm Machines, U. S. Bur. Agr. Econ. F.M. 46, November 1944.

7/ Hurst, W. M., and Church, L. M. Power and Machinery in Agriculture. U. S. Dept. Agr. Misc. Pub. 157, April 1933.

8/ Development of the Combine, Farm Implement News, II, No. 49, Dec. 6, 1928.

9/ Hopkins, John A., and others, Wheat and Oats. U. S. Works Progress Admin., National Research Project, Report No. A-10. April 1939. This report shows 70,000 combines in 1936 and 90,000 in 1939.

10/ U. S. Bureau of the Census. Facts for Industry.

In 1942, estimates were made from information supplied by crop correspondents on number of pickup balers on farms, and in 1950, the Census of Agriculture obtained the number on farms. Intermediate estimates were based largely on annual shipments of manufacturers. Estimates since 1950 are based on shipments and for some years on numbers reported by crop correspondents. Numbers of forage harvesters for 1951 and 1954 are based largely on reports from crop correspondents. For 1952 and 1953, shipments of manufacturers were used in making the estimates.

For both pickup balers and forage harvesters, it was necessary to adjust slightly only the 1955 preliminary estimates when the November 1954 census reports became available.

Table 16.- Motor vehicles and specified machines on farms, United States, January 1, 1910-56 1/

Year	Tractors (exclusive of steam and garden)	Motor-trucks	Auto-mobiles	Grain combines	Corn-pickers	Farms with milking machines	Pickup balers	Field forage harvesters
	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands
1910	1	0	50	1	--------	12	-------	---------
1911	4	2	100					
1912	8	5	175					
1913	14	10	258					
1914	17	15	343					
1915	25	25	472					
1916	37	40	687					
1917	51	60	966					
1918	85	89	1,502					
1919	158	111	1,760					
1920	2/ 246	2/ 139	2/ 2,146	4	10	55	-------	---------
1921	343	207	2,382					
1922	372	263	2,425					
1923	428	316	2,618					
1924	496	363	3,004					
1925	549	459	3,283					
1926	621	559	3,605					
1927	693	662	3,820					
1928	782	753	3,820					
1929	827	840	3,970					
1930	2/ 920	2/ 900	2/ 4,135	61	50	100	-------	---------
1931	997	920	4,077					
1932	1,022	910	3,798					
1933	1,019	865	3,399					
1934	1,016	875	3,399					
1935	1,048	890	3,642					
1936	1,125	923	3,735					
1937	1,230	990	3,962					
1938	1,370	1,042	4,109					
1939	1,445	1,020	4,030					

- Continued -

Table 16.- Motor vehicles and specified machines on farms, United States, January 1, 1910-56 1/ - Continued

Year	Tractors (exclusive of steam and garden)	Motor-trucks	Auto-mobiles	Grain combines	Corn-pickers	Farms with milking machines	Pickup balers	Field forage harvesters
	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands	Thousands
1940	3/1,545	2/1,047	2/4,144	190	110	175	-----	-----
1941	1,665	1,095	4,330	225	120	210	-----	-----
1942	1,860	1,160	4,670	275	130	255	4/ 25	-----
1943	2,055	1,280	4,350	320	138	275	31	-----
1944	2,160	1,385	4,185	345	146	300	34	-----
1945	2/2,354	2/1,490	2/4,148	2/375	168	2/365	42	4/ 20
1946	2,480	1,550	4,260	420	203	440	54	25
1947	2,613	1,700	4,350	465	236	525	65	30
1948	2,821	1,900	4,225	535	299	575	90	45
1949	3,123	2,065	4,290	620	372	610	135	60
1950	2/3,394	2/2,207	2/4,199	2/714	2/456	2/636	2/196	81
1951	3,678	2,310	4,220	810	522	655	240	102
1952	3,907	2,410	4,230	887	588	675	298	124
1953	4,100	2,520	4,240	930	630	690	345	148
1954	4,243	2,610	4,250	965	660	705	395	175
1955	5/4,345	2,701	4,258	980	688	712	448	202
1956 6/	4,450	2,800	4,260	1,000	700	715	490	225

1/ Facts for Industry reports of the Bureau of the Census, annual registrations of motor vehicles, and results of enumerative surveys were used in developing estimates for years and machines not covered by census reports.

2/ Census of Agriculture, census dates January 1, 1920 and 1945; April 1, 1930, 1940, and 1950.

3/ The Census of Agriculture of 1940 reported 1,567,430 tractors on farms on April 1. The figure used in this series is an adjusted census figure to make allowance for tractors added to the number on farms between January 1 and April 1. Similar adjustments for other census years were not considered worthwhile.

4/ Information for previous years is not available.

5/ Census of Agriculture, November 1954.

6/ Preliminary.

Table 17.- Number of tractors on farms, by type, United States, January 1, 1945-56

Year	Total	Wheel, including homemade	Crawler	Garden 1/
	Thousands	Thousands	Thousands	Thousands
1945 2/	2,422	2,255	99	68
1946	2,560	2,374	106	80
1947	2,735	2,500	113	122
1948	2,980	2,700	121	159
1949	3,315	2,990	133	192
1950 3/	3,610	3,250	144	216
1951	3,930	3,531	147	252
1952	4,195	3,756	151	288
1953	4,415	3,946	154	315
1954	4,580	4,086	157	337
1955 4/	4,692	4,185	160	347
1956 5/	4,810	4,285	165	360

1/ Prior to 1945, the first year the census reported number of garden tractors on farms, the number of garden tractors on farms is estimated to be as follows: 1941, 10,000; 1942, 25,000; 1943, 45,000; 1944, 55,000.
2/ Census of Agriculture, January 1.
3/ Census of Agriculture, April 1.
4/ Census of Agriculture, November 1954.
5/ Preliminary.

PERSONS SUPPORTED BY PRODUCTION OF ONE FARMWORKER

This series measures the number of consumers who are supported by the agricultural production of one farmworker. Actually, the series is a ratio of consumers to farmworkers in the United States. The ratio varies from year to year, depending on total agricultural production, agricultural imports and exports, total population of the United States, and number of farmworkers. But the longer time changes are a type of measure of farmworker efficiency, expressed in terms of number of persons per worker supplied with food, fiber, and tobacco.

The term, "consumer support," has not meant the same thing over time. In the early part of the 136-year period, farmworkers did many things both on the farm and in the farm home which later were done by city workers. Furthermore, agricultural products supplied consumers probably are now greater than they were in early years when diets and clothing were simple and sometimes meager.

The first step in measuring the number of consumers supplied with their agricultural needs by one farmworker is to determine the level of products available for consumption per capita. The total amount available for consumption in this country during any given year is the current dollar value of farm production in this country minus the value of agricultural exports plus the value of agricultural imports; and this value divided by the total population of the country gives the per capita level of agricultural products available for any given year.

The value of farm production in the United States minus the value of agricultural exports equals the value of agricultural products available to our population from United States production. This value divided by the per capita level of agricultural products available gives the number of persons in the United States who could be supplied at this level of support with agricultural products from our farm production.

The value of agricultural exports divided by the per capita level of agricultural products available in the United States gives the number of persons abroad who could be supplied at the same level with agricultural products from our farm production.

Because of their close interrelationship, the two accompanying series, total farm employment and total United States population, are carried along with the series on persons supported by the production of one farmworker. Employment data for 1820-1900 are estimates based largely on the size of the labor force engaged in agricultural pursuits. 11/

11/ U. S. Bureau of the Census. Sixteenth Census of the United States: 1940 series, P-9, No. 11, March 1942.

Data for 1910-55 are taken from releases on farm employment issued by the Agricultural Marketing Service, rounded to the nearest hundred thousand.

The source of the population estimates is the Bureau of the Census. Data are adjusted to 1940 definitions, and those in later years include civilians overseas with the Armed Forces. Figures for 1820 to 1840 are from the "Statistical Abstract," 1943; those for 1850 to 1890 are from the "Statistical Abstract" for 1944-45; those for 1900 to 1953 are from the "Statistical Abstract" for 1954, and those for later dates are compiled from reports of the Bureau of the Census, rounded to hundred thousands. 12/

Data on value of exports for 1820 to 1840 are estimates made from data from several sources; those for 1850 to 1890 are from the Bureau of the Census "Statistical Abstract" for 1944-45; 13/ and those for 1900-55 are based on computations of the Foreign Agricultural Service, published in "Agricultural Statistics." 14/

For the purpose intended, the series serves very well. As a longtime measure, it appraises adequately the changes in efficiency of farmworkers. It is not intended to be a precise index of slight year-to-year variations in worker efficiency. Slight variations from year to year or during short periods merely denote changes caused primarily by ups and downs in total yearly agricultural production and farm employment.

12/ U. S. Department of Commerce. Statistical Abstract of the United States. Annual.

13/ See footnote 12.

14/ U. S. Department of Agriculture. Agricultural Statistics. Annual.

Table 18.- Persons supported by production of one farmworker, United States, 1820-1955

Year	Persons supported per farmworker			Total farm employment	Total United States population July 1 1/
	Total	At home	Abroad		
	Number	Number	Number	Millions	Millions
1820	4.12	3.84	0.28	2.4	9.6
1830	4.00	3.76	.24	3.3	12.9
1840	3.95	3.72	.23	4.4	17.1
1850	4.18	3.97	.21	5.7	23.3
1860	4.53	4.06	.47	7.3	31.5
1870	5.14	4.64	.50	8.0	39.9
1880	5.57	4.48	1.09	10.1	50.3
1890	5.77	4.69	1.08	11.7	63.1
1900	6.95	5.23	1.72	12.8	76.1
1910	7.07	6.05	1.02	13.6	92.4
1920	8.27	6.84	1.43	13.4	106.5
1930	9.76	8.78	.98	12.5	123.2
1940	10.81	10.45	.36	11.0	132.1
1941	12.09	11.10	.99	10.7	133.4
1942	12.97	11.81	1.16	10.5	134.9
1943	13.54	12.09	1.45	10.4	136.7
1944	13.98	12.62	1.36	10.2	138.4
1945	14.69	12.87	1.82	10.0	139.9
1946	14.28	12.36	1.92	10.3	141.4
1947	14.13	12.61	1.52	10.4	144.1
1948	14.52	12.83	1.69	10.4	146.6
1949	14.92	13.43	1.49	10.0	149.2
1950	15.49	13.70	1.79	9.3	151.7
1951	16.81	14.93	1.88	9.0	154.4
1952	17.32	15.88	1.44	8.7	157.0
1953	17.82	16.34	1.48	8.6	159.7
1954	18.73	16.81	1.92	8.5	162.4
1955 2/	19.74	17.73	2.01	8.2	165.2

1/ Includes persons in our military forces in this country and abroad.

2/ Preliminary.

U. S. GOVERNMENT PRINTING OFFICE: 1956 O - 390378